

REMARKS/ARGUMENTS

Favorable reconsideration of this application in view of the above amendments and following remarks is respectfully requested.

Claims 8-10, 12 and 14 are pending in this application. By this amendment the specification is amended, Claims 8, 12 and 14 are amended; and no claims are canceled or added herewith. It is respectfully submitted that no new matter is added by this amendment.

In the outstanding Office Action, the specification was objected to; Claims 8-10, 12 and 14 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent No. 5,983,524 to Polegato in view Applicants' admitted prior art (AAPA).

With respect to the objection to the specification for introduction of new matter, a complete and accurate translation of Italian application PD2002A000187 is provided herewith. Applicant submits that the translation supports Applicant's assertion of an inaccurate translation of the corresponding PCT application with respect to thermoplastic polyurethane being erroneously introduced, as discussed in the Amendment filed June 19, 2008.

Additionally, the specification is amended by the present amendment to replicate the disclosure contained in the translation of Italian application PD2002A000187. As such, contrary to the discussion in the outstanding Office Action that all adhesives manufactured by the company Schaetti are intended, the amended paragraph discloses that an example of a "*thermoreactive adhesive*" usable for the purposes of the invention is constituted by the specific product manufactured by for example, the company Schaetti and marketed under the name "PU SCHAETTI FIX 6050." That is, the specific product (PU SCHAETTI FIX 6050) is an example of a thermoreactive adhesive that can be used for the purposes of embodiments of the present invention. According to an example of the present invention, the membrane is connected to the protective layer in spots by a thermoreactive adhesive, i.e. a specific kind of

adhesives, and indicates the specific product “PU SCHAETTI FIX 6050” as an example of this kind of adhesive. Accordingly, withdrawal of the objection to the specification is respectfully requested.

Turning now to the merits, in order to expedite issuance of a patent in this case, Applicants have amended the independent claims to clarify patentable distinctions of the present invention over the cited references. Specifically, with respect to the rejection of the claims under 35 U.S.C. § 103(a) as unpatentable over Polegato in view of AAPA, it is submitted that the applied art does not render obvious the claimed features of a tread including a border formed as a single piece in a single molding step, that is joined perimetrically and hermetically to the mid-sole component to seal edges of the mid-sole component, with a membrane being associated with a protective layer by a thermoreactive adhesive, as recited in Claim 8 and similarly recited in Claims 12 and 14.

In contrast, Polegato discusses that the perimetric element that seals the mid-sole (i.e., the assembly comprising the membrane and the lower protective layer) from above is an element separate from the tread, to which it is assembled or overmolded. Please see the discussion with respect to Figs. 3, 4 and 10-12 of Polegato. As such, Polegato requires either a double injection-molding or an assembly of the two separate elements i.e., the tread and the perimetric sealing element, which results in greater manufacturing times and high costs of production and well as the use of two molds. Please see column 7, lines 5-67 of Polegato.

As clearly shown in for example Figure 1 of the present application, the border extends on a perimetrical portion of the upper face of the mid-sole, sealing the latter from above. The production in a single molding step of the tread together with the border so as to form a single piece, allows for reduction in production times, thus increasing the productivity. Moreover, it requires the use of only one mold, thus reducing the production costs. The

applied art does not teach the features of the claimed invention and therefore, cannot provide at least the advantages discussed above.

Further, Applicant submits that it would not have been obvious to substitute the glue disclosed by Polegato with a thermoreactive adhesive, as asserted in the Office Action. That is, one or more embodiments of the present invention teach to use thermoreactive adhesives in order to provide a coupling between the membrane and the respective protective layer which is resistant to high temperatures. According to an example of the invention, the use of a thermoreactive adhesive does not necessary have to provide a strong bond between the membrane and the protective layer. A main characteristic of a thermoreactive adhesive is that of having a structure that is thermally irreversible so that when subjected to high temperatures, such as during molding, the adhesive does not revert to their fluid condition. The resistance to the temperature is not a characteristic common to all kinds of adhesives, even of those adhesives having the same bonding force.

Polegato merely discusses that a membrane 15 and lower protective layer 16 are coupled to one another by spot gluing, using a commercially available adhesive that is resistant to hydrolysis. AAPA is discussed with respect to adhesives that are used to produce barrier fabrics for surgical uses. Applicants submit that the medical filed is far from the field of manufacturing soles for shoes and a person of ordinary skill in the art would not look to the medical field to solve a problem with respect to shoe soles. As such, Applicants submit that a person skilled in the art would not have been motivated to combine Polegato and AAPA.

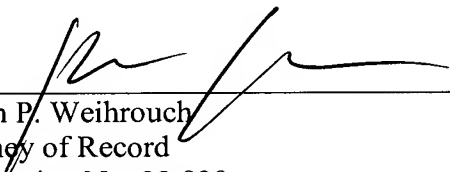
Accordingly, withdrawal of the rejection under 35 U.S.C. § 103(a) as unpatentable over Polegato in view of AAPA is respectfully requested.

Consequently, for the reasons discussed in detail above, no further issues are believed to be outstanding in the present application, and the present application is believed to be in condition for formal allowance. Therefore, a Notice of Allowance is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact the undersigned representative at the below-listed telephone number.

Respectfully submitted,

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**DECLARATION UNDER 37 CFR 1.68**

I, Albert JOSIF, declare

that I have my post-office address at Via Meravigli, 16 - 20123  
MILAN - ITALY

that I am registered U.S. Patent Agent (Reg. No. 22,917);

that I am familiar with the Italian and English languages;

that I am a Sworn Translator, appointed by the Court of Milan, Italy;

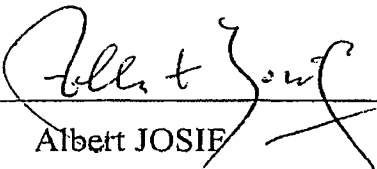
that I have prepared the attached translation of the Italian  
specification, claims and abstract entitled:

**"Improved waterproof and breathable sole for shoes"**

**filed under PD2002A000187 filed on July 9, 2002**

that said translation is complete and accurate and fairly reflects the  
meaning and content of said Italian language document;

I further declare that all statements made herein of my own  
knowledge are true and that all statements made on information and  
belief are believed to be true and further that these statements were  
made with the knowledge that wilful false statements and the like so  
made are punishable by fine or imprisonment, or both, under Section  
1001 of Title 18 of the United States Code, and that such wilful false  
statements may jeopardize the validity of the above US Patent or any  
Patent issuing thereon.

  
Albert JOSIF  
(Reg. No. 22,917)

Milan, Italy - December 2, 2008

## **IMPROVED WATERPROOF AND BREATHABLE SOLE FOR SHOES**

### **L. ABSTRACT**

The present invention relates to an improved waterproof and breathable sole for shoes.

The sole comprises a mid-sole (10, 110) with a membrane (11, 111) made of a material that is impermeable to water and permeable to water vapor and is connected in spots with a lower protective layer (14, 114) made of a material that is resistant to hydrolysis, water-repellent, breathable and/or perforated.

The sole also comprises a tread (15, 115) made of perforated elastomer that is joined perimetrically and hermetically to the component (10, 110).

The sole is characterized in that said membrane (11, 111) is associated with said protective layer (14, 114) by way of thermoreactive adhesive (13, 113).

# IMPROVED WATERPROOF AND BREATHABLE SOLE FOR SHOES

In the name of : GEOX S.p.A.

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## S P E C I F I C A T I O N

The present invention relates to an improved waterproof and breathable sole for shoes.

5 Plastic waterproof and breathable soles for shoes are already known.

One of these soles is disclosed in Italian patent no. 1,282,196 in the name of the same Applicant.

In this case, the sole comprises:

-- a mid-sole with a membrane made of a material that is impermeable to  
10 water and permeable to water vapor, associated with a lower protective layer made of a material that is resistant to hydrolysis, water-repellent, breathable and/or perforated;

-- a tread made of perforated elastomer that is joined perimetrically and hermetically to the mid-sole.

15 The waterproof and breathable sole disclosed in Italian patent no. 1,293,474 in the name of the same Applicant is also known; it comprises a preassembled insert in which there is a membrane that is impermeable to water and permeable to water vapor, associated with a lower protective layer made of a material that is resistant to hydrolysis, water-repellent, breathable  
20 and/or perforated.

The insert is completed by an element that is overmolded or assembled in place and surrounds the membrane and the protective layer and is joined hermetically to them.

The insert is part of a mid-sole and is joined together with said mid-sole  
25 to a tread made of perforated plastic, which is overmolded or assembled in place.

In both cases, the protective layer arranged below the membrane is meant to protect said membrane against piercing due to foreign objects accidentally passing through the holes.

30 The protective layer is normally made of felt and is coupled to the

membrane in a breathable manner (by means of spots of thermoplastic adhesive which has for example a polyurethane base), to allow the passage of the vapor from the inside of the shoe toward the outside through the holes provided in the tread.

5        Although the soles described above have been commercially available for years and are unanimously acknowledged to be capable of ensuring a correct exchange of heat and water vapor between the microclimate inside the shoe and the external microclimate, they have been found to have drawbacks, including in particular the tendency for the membrane to tear due to the  
10       different traction elasticity modulus with respect to the tread, with which it is monolithically assembled peripherally.

      The membrane is in fact normally made of expanded polytetrafluoroethylene, which is a scarcely elastic material, while the tread by its very nature and due to its operating requirements must be very elastic  
15       and flexible.

      Accordingly, the membrane is unable to absorb the flexural stresses that produce an elastic elongation of the polymer, of which the elastomeric tread is made (PVC, TR, polyurethane, rubber, et cetera), in movements, during use and accordingly tends to tear because its elasticity modulus is exceeded, and  
20       loses its waterproofness.

      The protective element below the membrane, which is normally made of polyester felt, has been found unable, on its own, to absorb the tensions induced by the deformations of the sole.

      In order to reduce the elongation, the structure disclosed in patent PD  
25       2000 A 242 has been adopted; this patent describes the use of composite materials with a high ultimate tensile strain and low elongation, but the insertion of said materials is expensive and also causes a general stiffening of the shoe.

      Furthermore, the problem of the breakage of the membrane is not solved  
30       permanently, because of the reversibility of the phenomenon of



thermoplasticity of the polyurethane adhesive used to laminate the membrane with the felt layer: the melting point of said adhesive (for example 65 °C) is in fact lower than the temperature (for example 180 °C) at which the polymer that constitutes the tread and must form a peripheral seal on the membrane is injected into the mold.

Temperatures higher than the melting point of the polyurethane adhesive can be reached both during the normal production of the shoe and during use of the shoe (for example when walking on hot tarmac during the summer period).

By reaching temperatures higher than the melting point, the thermoplastic adhesive is reactivated and the viscosity is reduced considerably (it is known that viscosity is a function of temperature), allowing complete absorption of said adhesive by the felt.

This means that once the assembly cools, there is no longer enough adhesive to allow adequate coupling of the membrane to the felt layer.

All the stress to which the sole is subjected during use is therefore transmitted to the membrane, which tears due to the problems described above.

This problem is entirely new in soles with respect to other uses for which a membrane that is impermeable to water and permeable to vapor is used.

This performance at high temperatures is in fact not required, for example, for producing laminated fabrics to be used as a lining on an upper, because in such cases temperatures on the order of the temperatures reached in the molding of soles made of polymeric materials are never reached.

In these cases, a maximum temperature of 100 °C can in fact be reached.

The aim of the present invention is therefore to provide a waterproof and breathable sole for shoes having an improved structure that is capable of eliminating the drawbacks noted above in known types, which lead to the tearing of the waterproof and water vapor-permeable membrane.

Within the scope of this aim, a consequent primary object is to not reduce

in any case the waterproofness and breathability capabilities of the sole.

Another object is to provide a sole that does not entail particular constructive complications with respect to known soles.

Another object is to provide a sole whose costs are competitive with  
5 respect to the costs of known types.

This aim and these and other objects that will become better apparent hereinafter are achieved by a waterproof and breathable sole for shoes, having a structure that comprises:

-- a mid-sole with a membrane made of a material that is impermeable to  
10 water and permeable to water vapor and is associated in spots with a lower protective layer made of a material that is resistant to hydrolysis, water-repellent, breathable and/or perforated;

-- a tread made of perforated elastomer that is joined perimetrically and hermetically to the mid-sole;  
15 said structure being characterized in that said membrane is associated with said protective layer by means of a thermoreactive adhesive.

Further characteristics and advantages of the invention will become better apparent from the detailed description of some embodiments thereof, illustrated by way of non-limitative example in the accompanying drawings,  
20 wherein:

Figure 1 is a transverse sectional view of a waterproof and breathable sole for shoes having the structure according to the invention, in a first embodiment;

Figure 2 is a transverse sectional view of a waterproof and breathable  
25 sole for shoes having the structure according to the invention, in a second embodiment.

With reference to the above cited Figure 1, a waterproof and breathable sole for shoes has, in a first embodiment, a structure that comprises a mid-sole 10 that is composed of a membrane 11 made of a material that is  
30 impermeable to water and permeable to water vapor (normally commercially

available and made for example of expanded polytetrafluoroethylene), laminated over a supporting mesh 12 made of synthetic material and associated, by way of spots of adhesive 13, with a lower protective layer 14 made of a material that is resistant to hydrolysis, water-repellent, 5 breathable and/or perforated, preferably a polyester felt.

The structure further comprises a tread 15 made of elastomer, with through holes 16, which is overmolded or assembled in place on the mid-sole 10 and is perimetrically joined hermetically thereto (see the borders 17 that surround its edges in Figure 1).

10 According to the invention, the structure is characterized in that said membrane 11 is associated with said protective layer 14 by way of a thermoreactive adhesive.

Thermoreactive adhesives are adhesives that are per se known in another technical field; they are in fact used for example to produce barrier fabrics 15 for surgical uses, which are formed by two or more layers of different materials that are laminated together.

Said fabrics in fact require repeated sterilizations in an autoclave at high temperatures in order to allow their reuse, and it is evident that the high temperature reached during the sterilization operation must not cause the 20 separation of the two or more elements that constitute the barrier fabric.

These adhesives, due to the temperature, produce many intermolecular bonds (between molecules), thus forming a three-dimensional structure that is partially rigid and in any case thermally irreversible.

The bonds occur between the NCO and OH groups that are present in the 25 molecular chains that constitute said adhesives.

Thermoreactive adhesives are manufactured for example by the company SCHAETTI AG, Switzerland, and marketed under the name PU SCHAETTI FIX 6050.

30 Practical tests of the use of these thermoreactive adhesives to associate in spots the membrane 11 with the protective layer 14 have shown that their

molecular bonds do not allow melting and absorption at high temperatures of the adhesive by the felt of the protective layer 14, preventing the separation of the membrane 11 and thus allowing the distribution of the stress over a larger cross-section (membrane 11 + felt of the layer 14).

5 All this avoids the breakage of the membrane 11 due to its elasticity modulus being exceeded.

With reference now to Figure 2 cited above, a waterproof and breathable sole for shoes, in a second embodiment, has a structure that comprises a preassembled insert 110, which corresponds to the mid-sole 10 of the  
10 previous embodiment and in which there is a membrane 111 which is made of a material that is impermeable to water and permeable to water vapor (normally commercially available, for example made of expanded polytetrafluoroethylene), which is laminated over a supporting mesh 112 made of synthetic material and associated by spots of adhesive 113 with a  
15 lower protective layer 114 made of a material that is resistant to hydrolysis, water-repellent, breathable and/or perforated, preferably a polyester felt.

The insert 110 is completed by a perimetric element 117 that is overmolded or assembled in place and surrounds the membrane 111 (with the mesh 112) and the protective layer 114 and is joined hermetically to  
20 them.

The insert 110 is joined to a tread 115 made of elastomer, with through holes 116, that is overmolded or assembled in place thereon.

In this case also, the structure is characterized in that said membrane 111 is associated with said protective layer 114 by way of a thermoreactive  
25 adhesive 113.

In practice it has been found that the intended aim and objects of the present invention have been achieved.

A waterproof and breathable sole for shoes having an improved structure has in fact been devised which eliminates the drawbacks of known types,  
30 which lead to the tearing of the waterproof and vapor-permeable membrane,

without reducing the waterproofness and breathability characteristics of the sole.

Moreover, the manufacture of the sole does not entail particular constructive complications with respect to known soles.

5 The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept.

All the details may further be replaced with other technically equivalent elements.

CLAIMS

1. A waterproof and breathable sole for shoes, having a structure that comprises:
  - a mid-sole (10, 100) with a membrane (11, 111) made of a material that is impermeable to water and permeable to water vapor and is **connected** in spots with a lower protective layer (14, 114) made of a material that is resistant to hydrolysis, water-repellent, breathable and/or perforated;
  - a tread (15, 115) made of perforated elastomer that is joined perimetrically and hermetically to the component (10, 110);
- 10 said structure being characterized in that said membrane (11, 111) is associated with said protective layer (14, 114) by way of a thermoreactive adhesive (13, 113).
2. The sole having the structure according to claim 1, characterized in that said membrane (11) and said protective layer (14) associated therewith
- 15 are joined hermetically to said tread (15), which is overmolded or assembled in place on said component (10).
3. The sole having the structure according to claim 1, characterized in that said membrane (111) and said protective layer (114) are part of a mid-sole (110) with a preassembled insert that comprises a perimetric element (117)
- 20 that is overmolded or assembled in place and surrounds said membrane (111) and said protective layer (114) and is joined to them hermetically, said insert (110) being coupled to said tread (115), which is overmolded or assembled in place thereon.
4. The sole according to one or more of the preceding claims,
- 25 characterized in that said thermoreactive adhesive is the one known as PU SCHAETTI FIX 6050 by SCHAETTI AG, Switzerland.
5. The use of thermoreactive adhesives to join in spots a membrane (11, 111) made of a material that is impermeable to water and permeable to water vapor and a protective layer (14, 114) made of a material that is resistant to
- 30 hydrolysis, water-repellent, breathable and/or perforated, in order to provide

waterproof and breathable soles for shoes.

6. The use according to the preceding claim, characterized in that said thermoreactive adhesive is the one known as PU SCHAETTI FIX 6050 by SCHAETTI AG, Switzerland.

- 5      7. A waterproof and breathable sole for shoes having the structure according to one or more of the preceding claims, and the use of thermoreactive adhesives to provide waterproof and breathable soles for shoes, characterized by what is described and illustrated in the accompanying drawings.